Minnesota Bureau of Criminal Apprehension

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LABORATORY BRIEFINGS

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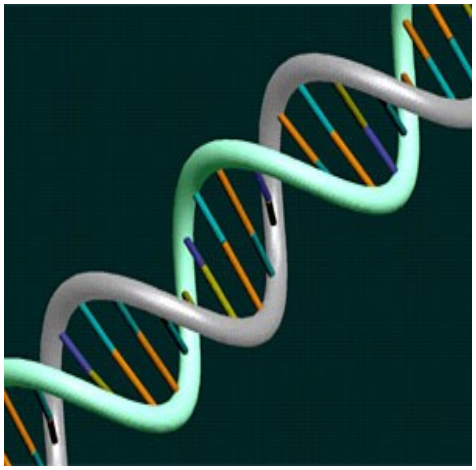
Biology Section: Nuclear DNA

The Biology Section of the BCA Laboratory is comprised of three sections: Nuclear DNA, Mitochondrial DNA, and Databasing.

This issue will highlight the Nuclear DNA section, its capabilities, proper evidence collection, and proper evidence packaging.

The Biology Section examines items of evidence for the presence of bodily fluids, which is known as serology. If a biological fluid is identified then that sample is passed on for DNA testing. Cases in the Nuclear DNA section are divided between serologists and DNA scientists, so there will often be two individuals working on one case.



A DNA Double Stranded Helix

Currently the laboratory is capable of detecting the following body fluids:

- Blood
- Semen
- Saliva
- Urine

The DNA testing process consists of four main steps: Extraction, Quantitation, Amplification, and Data Analysis.

Once a scientist has analyzed the data associated with the evidence (for either serology OR DNA), the case must undergo a rigorous review process. In the first review, the case is reviewed cover-to-cover by a second scientist. Once it has passed this first review, it is then reviewed a second time by an administrator. This review process verifies that the results obtained are accurate and ensures we are producing a high quality product.

Once the case is administratively approved, the report is sent to the agency.

Biology Section Info:

- Currently there are 23 scientists in the section. 20 are in St. Paul and 3 are located in the Bemidji Regional Lab
- 2 of these are devoted to working Minneapolis cases
- A case is split up between two individuals: one will examine the evidence for bodily fluids and the second will perform DNA testing

How Long Does it Take to Process my DNA Sample?!

The DNA testing process is sensitive and time consuming. Although we would prefer to process samples as quickly as they do on modern TV crime dramas, this is unfortunately not possible.

Recalling the steps of the DNA testing process listed above, here is a breakdown of how long it would ideally take for a case to go from start to finish (for DNA testing, not including serology exams).

Please keep in mind that a scientist works several cases at a time, so that may influence turnaround time for cases.

- Extraction: 6 hours
- Quantitation: 3 hours
- Amplification: 3 hours
- Instrument Run: 4 hours
- Data Analysis: 2 hours
- Review: One week

Evidence Collection

DNA can be retrieved from several sources. Biological fluids such as blood, semen, and saliva are great sources. It is important for the DNA testing process that evidence is collected properly.

For example, when collecting a swabbing from items such as pop cans, please use sterile water and collect **2** swabs. One half of the sample will be tested, and the other half will be preserved for possible testing by defense counsel.

Also, when labeling items of evidence, please take note that **buccal** swabs are **cheek** swabs. Please do not use buccal to describe swabbings taken from evidence as this may cause confusion as to what precisely the swabbing is from.

Beverage containers are a great source of potential saliva

"Chances are, if you can't open the bag and put the item back in, we can't either!"

Evidence Packaging

The proper collection of an item is essential to obtaining the greatest evidential value from its examination. For biological items, please be sure that wet items are allowed to AIR DRY! Dry items should be kept DRY! Once dry, please place them into tape sealed brown paper bags.

Please do NOT roll a bag around itself to tape seal it further. Chances are, if you can't open the bag and put the item back in, we can't either!

Separate items should be packaged separately. For example, if you have jeans, a shirt, and a hat from a suspect (or victim) each item should be placed into a separate, tape sealed brown paper bag.

Please consider that YOU may be a potential source of contamination. Therefore, it is critical that individuals who are handling evidence wear latex or nitrile gloves and gloves are changed between handling different items of evidence.

Whenever possible, please label the packaging to provide information as to what is contained within it.

Lastly, please ensure all evidence is tape sealed. This seals the packaging and prevents anything from getting into, or out of the container.

Proper evidence packaging makes for efficient examination!

Evidence: Crimes Against Persons

Before collecting the evidence, think about the circumstances of the case: who was bleeding, location of incident, how many individuals involved in the incident. All of these factors will influence what should be collected.

Not all items of evidence in a case are examined. The scientist will screen the evidence for probative value, and pending results, will examine additional items.

For example, a criminal sexual conduct case is submitted to the laboratory. The agency submits a sexual assault kit from the victim, clothing from the victim, and the bedding where the assault was alleged to have occurred. If the kit is positive for semen, the scientist will not examine the clothing. If the kit is negative however, the clothing, and possibly the bedding will be examined in the case.

Evidence: Property Crimes

Items from non-violent crimes that are currently **NOT TESTED** include:

- general swabs of steering wheels
- gear shift knobs
- door handles
- glove boxes
- "smudged areas"- computers, TV, safes
- Drug paraphernalia and baggies
- TV cables

We currently do NOT test

- General Swabs *of objects NOT foreign to the scene for touch DNA (including swabs of tools, safes, counters)*

So remember for **property crimes**, an item must be foreign to the scene for us to test it!

*"Please remember that the evidence submission guidelines **vary** depending on the type of crime committed."*

Good examples of items to look for in property crimes:

- Tools that are foreign to the scene that the suspect may have brought with them
- Pop cans or cigarette butts
- Blood stains
- Clothing items that are foreign to the scene

Exceptional Evidence!

Evidence left at a crime scene may be as apparent as a bloodstain or cigarette butt. Did you ever think to swab that slice of pizza left in car? A quick thinking officer responding to an auto theft did! While investigating a burglary, the officer noted a half eaten piece of pizza.

The vehicle's owner informed the officer that the pizza was not there when he left (foreign to the scene!). The officer submitted the slice of pizza to us.

A serologist was able to swab the area of the pizza where there appeared to be teeth marks.

A DNA scientist was able to develop a partial DNA profile from these swabs. There was not enough genetic information to search the databases, but lo and behold, DNA was present!

Although you more frequently encounter routine evidence, such as pop cans or cigarette butts, please feel free to contact us for any "unusual" items.

Biology Section

BUREAU OF CRIMINAL APPREHENSION

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Mission Statement:

The Bureau of Criminal Apprehension protects Minnesotans and all who visit our state by providing services to prevent and solve crimes in partnership with law enforcement, public safety and other criminal justice agencies.

Questions? Concerns? Please Call!

The guidelines given here may not cover every item of evidence you encounter. If you ever have a question about proper collection of evidence or if a certain item is suitable, please give us a call. Please call the main line at *651-793-2900* and they will direct your call to the Biology Section. If you would like to inquire about the status of your case, please call us and we would be happy to give you an update!